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EXAMINER	
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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/810,638
Filing Date: March 29, 2004
Appellant(s): REITER, JEFFREY SHANE

Bernard P. Codd
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed December 3, 2008 appealing from the Office action mailed March 3, 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,627,253	SUZUKI et al.	09-2003
6,458,253	ANDO et al.	10-2002

5,620,523	MAEDA et al.	04-1997
5,228,968	ZEJDA	07-1993

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

It should be noted as pointed out by Appellant in their brief on page 4 at the footnote that claim 10 was canceled in the Amendment filed December 10, 2007. The statement of rejections now corrects this typographical error and removes claim 10 from the statement of rejections.

The 35 U.S.C. 112 Rejections:

Claims 7 and 13 are indefinite because these claims recite other methods besides sputtering methods. The independent claims appear to limit the apparatus and method to sputtering since they have been amended to include cathode/target assemblies. Clarification is requested.

The 35 U.S.C. 103 Rejections:

Claims 1-8, 11-14, 16 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zejda (U.S. Pat. 5,228,968) in view of Maeda et al. (U.S. Pat. 5,620,523) and Ando et al. (U.S. Pat. 6,458,253).

Regarding claim 1, Zejda teach an apparatus for treating or processing at least one substrate/workpiece. (See Abstract; Figs. 1-4) A chamber 1 defining an interior space. (Column 2 line 50; Figs. 1-4) Mounting means adapted for positioning at least one substrate/workpiece in the interior space of the chamber for receiving treatment in the plasma. (Column 2 lines 61-62; Figs. 1-4; plasma inherent to sputtering see

Abstract) A gas supply means for injecting gas(es) into the interior of the chamber. (Column 3 lines 32-38) An outlet extending into the chamber for injecting gases into the interior space. (Column 3 lines 32-38) The apparatus comprises a spaced apart pair of cathode/target assemblies and mounting means positions at least one substrate/workpiece in the space between the pair of cathode/target assemblies and gas outlet portions positioned between the spaced apart pair of cathode/target assemblies. (Column 2 lines 58-60; Figs. 1-4)

Regarding claim 6, Zejda teach the interior of the chamber is to be maintained at a reduced pressure by a vacuum pump. (Column 2 line 56)

Regarding claims 7, 8, the apparatus is adapted to perform a plasma treatment or process of sputter deposition. (See Abstract)

Regarding claim 11, Zejda teaches a method of treating or processing at least one substrate/workpiece. (See Abstract; Fig. 1-4) Providing a chamber 1 defining an interior space for generating a plasma. (Column 2 line 50; Figs. 1-4) Mounting at least one substrate/workpiece in the interior space of the chamber for receiving treatment in the plasma between a spaced apart pair of cathode/target assemblies. (Column 2 lines 58-62; Figs. 1-4; plasma inherent to sputtering see Abstract) Injecting gas(es) into the interior of the chamber between the cathode/targets. (Column 3 lines 32-38) A plasma is generated because sputtering inherently requires it. (See Abstract) An outlet extending into the chamber for injecting gases into the interior space. (Column 3 lines 32-38) The apparatus comprises a spaced apart pair of cathode/target assemblies and mounting means positions at least one substrate/workpiece in the space between the

pair of cathode/target assemblies and gas outlet portions positioned between the spaced apart pair of cathode/target assemblies. (Column 2 lines 58-60; Figs. 1-4) The substrate is sputter coated. (See Abstract)

Regarding claim 12, Zejda teach the interior of the chamber is to be maintained at a reduced pressure by a vacuum pump. (Column 2 line 56)

Regarding claims 13, 14, Zejda teach the apparatus is adapted to perform a plasma treatment or process of sputter deposition. (See Abstract)

Regarding claim 16, Zejda teach coating magnetic disks. (Column 1 lines 57-60)

The differences between Zejda and the present claims is that means for generating a plasma in the interior space of the chamber is not discussed (Claims 1, 11), an inlet portion extending exteriorly of the chamber is not discussed (Claims 1, 11), a pair of arcuately shaped tubular gas outlet portions is not discussed (Claims 1, 11), means for applying a bias potential to the gas supply means for suppressing plasma formation at the portion, wherein the means for applying a bias potential is electrically isolated from the means for generating a plasma is not discussed (Claim 1), means for electrically isolating the gas supply means from the chamber and the means for generating the plasma is not discussed (Claims 2, 11), the outlet portion of the gas supply means extends through an electrically insulated opening in a wall of the chamber is not discussed (Claim 3), means for applying the bias potential comprises means for applying a DC , AC, or RF bias potential is not discussed (Claim 4), means for applying the bias potential comprises means for applying a selected polarity DC bias potential of up to about 1,000 V is not discussed (Claim 5), applying a bias potential to the gas

supply means to suppress plasma formation at the at least one outlet orifice, wherein the gas supply means is electrically isolated from the means for generating a plasma is not discussed (Claim 11), injecting gas(es) into the interior space of the chamber by means of an electrically isolated gas supply means having an inlet portion extending exteriorly of the chamber and an outlet portion extending into the chamber via an electrically insulated opening in a wall of the chamber is not discussed (Claim 18), applying a DC, AC, or RF bias potential is not discussed (Claim 19) and applying a selected polarity DC bias potential of up to about 1,000V is not discussed (Claim 20).

Regarding means for generating a plasma in the interior space of the chamber (Claims 1, 11), Zejda discussed above teaches sputtering which inherently require a power supply means for generating a plasma to produce sputtering. (See Zejda discussed) If Applicant disputes this Ando et al. shows means (82) for generating a plasma in the interior space of a chamber for sputtering. (Column 12 lines 60-65; Column 13 lines 41-43)

Regarding inlet portion extending exteriorly of the chamber (Claims 1,11), Ando et al. teach an inlet portion extending exteriorly of the chamber. (Fig. 7; Column 13 lines 51-56)

Regarding a pair of arcuately shaped tubular gas outlet portions (Claims 1, 11), Zejda teach in Fig. 4 ring shaped gas supply means disposed between spaced apart targets. (See Fig. 4) Maeda et al. teach alternative ways to supply gas to a plasma chamber. In Figs. 9A and 9B ring shaped gas supply means are used. Alternatively as

shown in Figs 8A and 8B arcuate gas supply means can be utilized. (Column 8 lines 64-68; Column 9 lines 1-30)

Regarding the means for applying a bias potential to the gas supply means for suppressing plasma formation at the portion, wherein the means for applying a bias potential is electrically isolated from the means for generating a plasma (Claim 1), Ando et al. teach means (81) for applying a bias potential to the gas supply means for suppressing plasma formation at the at least one outlet orifice, wherein the means for applying the bias potential (81) is electrically isolated from the means (82) for generating the plasma. (Fig. 7; Column 12 lines 59-60; Column 13 lines 51-57; Column 16 lines 60-67)

Regarding the means for electrically isolating the gas supply means from the chamber and the means for generating the plasma (Claims 2, 11), Ando et al. show in Fig. 1A an insulating member 40 for electrically isolating the gas supply means from the chamber and the means for generating the plasma (i.e. target/cathode). (Column 5 lines 13-15; Column 5 lines 31-34; Column 6 lines 45-49)

Regarding the outlet portion of the gas supply means extends through an electrically insulated opening in a wall of the chamber (Claim 3), Ando et al. show the outlet portion of the gas supply means extending through an electrically insulating opening in a wall of the chamber. (Column 5 lines 13-15; Column 5 lines 31-34; Column 6 lines 45-49)

Regarding the means for applying the bias potential comprises means for applying a DC , AC, or RF bias potential (Claim 4), Ando et al. teach the means for

applying the bias potential comprises means for applying a DC bias potential. (Column 12 lines 59)

Regarding the means for applying the bias potential comprises means for applying a selected polarity DC bias potential of up to about 1,000 V (Claim 5), Ando et al. teach the bias potential can be from +50V to -50V. (Column 23 lines 9-10)

Regarding applying a bias potential to the gas supply means to suppress plasma formation at the at least one outlet orifice, wherein the gas supply means is electrically isolated from the means for generating a plasma (Claim 11), Ando et al. teach means (81) for applying a bias potential to the gas supply means for suppressing plasma formation at the at least one outlet orifice, wherein the means for applying the bias potential (81) is electrically isolated from the means (82) for generating the plasma. (Fig. 7; Column 12 lines 59-60; Column 13 lines 51-57; Column 16 lines 60-67)

Regarding injecting gas(es) into the interior space of the chamber by means of an electrically isolated gas supply means having an inlet portion extending exteriorly of the chamber and an outlet portion extending into the chamber via an electrically insulated opening in a wall of the chamber (Claim 18), Ando et al. teach means (81) for applying a bias potential to the gas supply means for suppressing plasma formation at the at least one outlet orifice, wherein the means for applying the bias potential (81) is electrically isolated from the means (82) for generating the plasma. (Fig. 7; Column 12 lines 59-60; Column 13 lines 51-57; Column 16 lines 60-67) Ando et al. show in Fig. 1A an insulating member 40 for electrically isolating the gas supply means from the

chamber and the means for generating the plasma (i.e. target/cathode). (Column 5 lines 13-15; Column 5 lines 31-34; Column 6 lines 45-49)

Regarding applying a DC, AC, or RF bias potential (Claim 19), applying a DC bias potential. (Column 12 lines 59)

Regarding applying a selected polarity DC bias potential of up to about 1,000V (Claim 20), Ando et al. teach the bias potential can be from +50V to -50V. (Column 23 lines 9-10)

The motivation for utilizing arcuate gas supply means of Maeda et al. is that it allows for improving film uniformity. (Column 2 lines 16-17)

The motivation for utilizing the features of Ando et al. is that it allows for producing a thin film that suffers little damage from negative ions, positive ions, and electrons. (Column 2 lines 62-65)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Zejda with the features of Maeda et al. and Ando et al. is that it allows for depositing a film with uniformity and little damage.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zejda in view of Maeda et al. and Ando et al. as applied to claims 1-8, 11-14, 16, 18-20 above, and further in view of Suzuki et al. (U.S. Pat. 6,627,253).

The difference not yet discussed is reactive sputtering of a ferromagnetic target material in an oxygen-containing plasma to deposit an oxygen-containing ferromagnetic layer on each surface of the at least one substrate/workpiece. (Claim 17)

Regarding claim 17, Suzuki et al. teach sputtering a ferromagnetic target material in an oxygen-containing plasma to deposit an oxygen containing ferromagnetic layer on each surface of the at least one substrate/workpiece. (Column 8 lines 58-67; Column 9 lines 1-18)

The motivation for utilizing the features of Suzuki et al. is that it allows for reducing the media noise of the magnetic layer. (Column 7 lines 48-49)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Suzuki et al. because it allows for reducing the media noise of the magnetic layer.

(10) Response to Argument

1. Rejection under 35 U.S.C. 112, second paragraph, as being indefinite

Claims 7 and 13

This rejection has been overcome based on the Amendment submitted Under 37 C.F.R. 1.116 filed April 30, 2008 and entered on May 7, 2008.

2. Rejection under 35 U.S.C. 103 (a) as being unpatentable over Zejda in view of Maeda et al. and Ando et al.:

Claims 1-8

In response to the argument that the combination of Zejda, Maeda et al. and Ando et al. do not teach a gas supply means for injecting gas(es) into the interior space of the chamber comprising an outlet extending into the chamber and including a pair of arcuately-shaped tubular gas outlet portions for injecting gas(es) into the interior space, and the arcuately-shaped tubular gas outlet portions are positioned between the

spaced-apart pair of cathode/target assemblies, it is argued that Zejda teach in Fig. 4 a gas supply means for injecting gas(es) into the interior space of the chamber comprising an outlet extending into the chamber and including ring shaped gas supply means between facing sputter targets for providing gas to the sputtering apparatus. Maeda et al. suggest in Figs. 8A, 8B, 9A and 9B utilizing in place of ring shaped gas means arcuate shaped gas means for providing gas for plasma thin film forming apparatus. Ando et al. teach means for applying a bias potential to the gas supply means. (See Zejda, Maeda et al. and Ando et al. discussed above)

In response to the argument that it would not have been obvious to combine Maeda et al. with Ando et al. and Zejda. because Ando et al. and Zejda are directed to sputtering apparatuses and processes while Maeda et al. are directed to chemical vapor deposition, it is argued that it would have been obvious to one of ordinary skill in the art to have combined Maeda et al. with Ando et al. and Zejda because all the references are directed to providing gases to chambers to form plasmas in order to deposit thin films. For example Maeda et al. in their Abstract mention providing gas to form a plasma such that thin films are formed. The gas is supplied through gas supply means as shown in Maeda et al.'s Figs. 8A, 8B, 9A and 9B. Both Zejda and Ando et al. teach sputtering to form films. Ando et al. in the Abstract and at Column 5 lines 31-33 for example teaches forming thin films by forming a plasma from a gas and sputtering a target such that thin films are formed. As such one of ordinary skill in the art when considering gas delivery means for film formation would consider the references of Zejda, Ando et al. and Maeda et al. combinable because they are concerned with thin

film formation from plasma production. (See Maeda et al., Ando et al. and Zejda discussed above)

In response to the argument that it would not have been obvious to have modified Zejda with the features of Ando et al. because Ando et al.'s target does not face the substrate and Ando et al.'s shutter benefit would be lost, it is argued that one of ordinary skill in the art would look to Ando et al. to modify Zejda because Ando et al. teach biasing the gas supply means in order to prevent negative ions from bombarding the substrate. (See Zejda and Ando et al. discussed above)

In response to the argument that it would not have been obvious to have modified Zejda with the features of Maeda et al. because Maeda et al. is directed toward CVD and does not have sputter targets, it is argued that it would have been obvious to one of ordinary skill in the art to have combined Maeda et al. with Zejda because all the references are directed to providing gases to chambers to form plasmas in order to deposit thin films. For example Maeda et al. in their Abstract mention providing gas to form a plasma such that thin films are formed. The gas is supplied through gas supply means as shown in Maeda et al.'s Figs. 8A, 8B, 9A and 9B. Both Zejda and Ando et al. teach sputtering to form films. Ando et al. in the Abstract and at Column 5 lines 31-33 for example teaches forming thin films by forming a plasma from a gas and sputtering a target such that thin films are formed. As such one of ordinary skill in the art when considering gas delivery means for film formation would consider the references of Zejda, Ando et al. and Maeda et al. combinable because they are

concerned with thin film formation from plasma production. (See Maeda et al., Ando et al. and Zejda discussed above)

In response to the argument that Maeda et al.'s gas injectors serve a completely different purpose than the gas injectors of Zejda and Ando et al. because Maeda et al.'s gas injectors provide gas that forms material to be deposited on the substrate whereas in the sputter process gas is used to knock molecules off a target, it is argued that Maeda et al.'s gas injectors provide gas to form a plasma. Zejda and Ando et al.'s gas injectors also provide gas to form a plasma. As such the gas injectors of all the references serve the same purpose which is to provide a gas for plasma production and therefore the references would be combinable. (See Maeda et al., Zejda and Ando et al. discussed above)

In response to the argument that Maeda et al. is directed to a different field of endeavor than Zejda and Ando et al., it is argued that the field of endeavor for Zejda and Maeda et al. is the same (i.e. the deposition of thin films) and the references therefore are combinable. (See Zejda and Maeda et al. discussed above)

In response to the argument that Maeda et al. and Ando et al. provide no motivation to modify Zejda, it is argued that the motivation for modifying Zejda with Maeda et al. is that it improves film uniformity and the motivation for modifying Zejda with Ando et al. is that it prevents negative ions from damaging the thin film. (See Maeda et al., Ando et al. and Zejda discussed above)

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that

any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Claims 11-14, 16, and 18-20

In response to the argument that the combination of Zejda, Maeda et al., and Ando et al. do not teach a method of treating or processing at least one substrate/workpiece in a plasma, comprising the step of injecting gas(es) between the spaced-apart pair of cathode/target assemblies by means of an electrically isolated gas supply means having a pair of arcuately-shaped tubular gas outlet portions, it is argued that Zejda teach in Fig. 4 a gas supply means for injecting gas(es) into the interior space of the chamber for treating substrates comprising an outlet extending into the chamber and including ring shaped gas supply means between facing sputter targets for providing gas to the sputtering apparatus. Maeda et al. suggest in Figs. 8A, 8B, 9A and 9B utilizing in place of ring shaped gas means arcuate shaped gas means for providing gas for plasma thin film forming apparatus. Ando et al. teach means for applying a bias potential to the gas supply means which is electrically isolated. (See Zejda, Maeda et al. and Ando et al. discussed above)

In response to the argument that it would not have been obvious to combine Maeda et al. with Ando et al. and Zejda. because Ando et al. and Zejda are directed to sputtering apparatuses and processes while Maeda et al. are directed to chemical vapor deposition, it is argued that it would have been obvious to one of ordinary skill in the art to have combined Maeda et al. with Ando et al. and Zedja because all the references are directed to providing gases to chambers to form plasmas in order to deposit thin films. For example Maeda et al. in their Abstract mention providing gas to form a plasma such that thin films are formed. The gas is supplied through gas supply means as shown in Maeda et al.'s Figs. 8A, 8B, 9A and 9B. Both Zejda and Ando et al. teach sputtering to form films. Ando et al. in the Abstract and at Column 5 lines 31-33 for example teaches forming thin films by forming a plasma from a gas and sputtering a target such that thin films are formed. As such one of ordinary skill in the art when considering gas delivery means for film formation would consider the references of Zejda, Ando et al. and Maeda et al. combinable because they are concerned with thin film formation from plasma production. (See Maeda et al., Ando et al. and Zejda discussed above)

In response to the argument that it would not have been obvious to have modified Zejda with the features of Ando et al. because Ando et al.'s target does not face the substrate and Ando et al.'s shutter benefit would be lost, it is argued that one of ordinary skill in the art would look to Ando et al. to modify Zejda because Ando et al. teach biasing the gas supply means in order to prevent negative ions from bombarding the substrate. (See Zejda and Ando et al. discussed above)

In response to the argument that it would not have been obvious to have modified Zejda with the features of Maeda et al. because Maeda et al. is directed toward CVD and does not have sputter targets, it is argued that it would have been obvious to one of ordinary skill in the art to have combined Maeda et al. with Zedja because all the references are directed to providing gases to chambers to form plasmas in order to deposit thin films. For example Maeda et al. in their Abstract mention providing gas to form a plasma such that thin films are formed. The gas is supplied through gas supply means as shown in Maeda et al.'s Figs. 8A, 8B, 9A and 9B. Both Zejda and Ando et al. teach sputtering to form films. Ando et al. in the Abstract and at Column 5 lines 31-33 for example teaches forming thin films by forming a plasma from a gas and sputtering a target such that thin films are formed. As such one of ordinary skill in the art when considering gas delivery means for film formation would consider the references of Zejda, Ando et al. and Maeda et al. combinable because they are concerned with thin film formation from plasma production. (See Maeda et al., Ando et al. and Zejda discussed above)

In response to the argument that Maeda et al.'s gas injectors serve a completely different purpose than the gas injectors of Zejda and Ando et al. because Maeda et al.'s gas injectors provide gas that forms material to be deposited on the substrate whereas in the sputter process gas is used to knock molecules off a target, it is argued that Maeda et al.'s gas injectors provide gas to form a plasma. Zejda and Ando et al.'s gas injectors also provide gas to form a plasma. As such the gas injectors of all the references serve the same purpose which is to provide a gas for plasma production and

therefore the references would be combinable. (See Maeda et al., Zejda and Ando et al. discussed above)

In response to the argument that Maeda et al. is directed to a different field of endeavor than Zejda and Ando et al., it is argued that the field of endeavor for Zejda and Maeda et al. is the same (i.e. the deposition of thin films) and the references therefore are combinable. (See Zejda and Maeda et al. discussed above)

In response to the argument that Maeda et al. and Ando et al. provide no motivation to modify Zejda, it is argued that the motivation for modifying Zejda with Maeda et al. is that it improves film uniformity and the motivation for modifying Zejda with Ando et al. is that it prevents negative ions from damaging the thin film. (See Maeda et al., Ando et al. and Zejda discussed above)

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

3. Rejection under 35 U.S.C. 103(a) as being unpatentable over Zejda in view of Maeda et al. and Ando et al. and further in view of Suzuki et al.:

In response to the argument that Suzuki do not teach the steps of mounting/positioning at least one substrate/workpiece between a spaced-apart pair of cathode/target assemblies in the interior space of the chamber, and injecting gas(es) between the spaced-apart pair of cathode/target assemblies by means of an electrically isolated gas supply means having a pair of arcuately-shaped tubular gas outlet portions,

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Rodney G. McDonald

/Rodney G. McDonald/

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